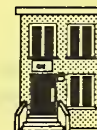aQR201
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FSIS
Background

United States
Department of
Agriculture

**Food Safety
and Inspection
Service**

Washington, DC
20250

Salmonella and Food Safety

Chicken, turkey, pork, beef, and other meat and poultry products are important sources of protein and other nutrients. Unfortunately, these foods--like eggs, raw milk, and all raw foods of animal origin--may also carry salmonella and other bacteria. The good news is that these bacteria don't have to cause illness. Routine food safety can destroy salmonella and other bacteria.

The Food Safety and Inspection Service (FSIS) oversees the processing of meat and poultry from the time animals enter the slaughter plant until packaged products leave the plant. FSIS also conducts a comprehensive food safety education program, including a toll-free hotline. FSIS encourages manufacturers to provide "care" information that reminds consumers about thorough cooking and safe handling of meat and poultry products.

Consumers have a right to meat and poultry that is as free as possible of bacteria. However, after more than 20 years of research, it is still economically impossible to produce "salmonella-free" raw meat and poultry. With or without a breakthrough, good sanitation and careful food handling will always be necessary to prevent bacteria on raw products from causing illness--just as toothbrushing is necessary to prevent other bacteria from causing dental cavities.

What is salmonella?

This FSIS backgrounder answers common questions about salmonella and offers some tips for safe handling of meat and poultry to prevent food-borne illness.

The salmonella family includes about 2,000 different strains of bacteria, but only 10 strains cause most reported salmonella infections. Strains that may cause no symptoms in animals can make people sick, and vice versa. A salmonella bacterium is a one-celled organism that can't be seen, touched or tasted. The bacteria are common in the intestinal tracts and waste of livestock, poultry, dogs, cats, rats, and other warm-blooded animals.

What is salmonellosis?

Salmonellosis, or a salmonella infection, is the illness that can occur if live salmonella bacteria enter the body -- usually through food. Most reported outbreaks of food-borne illness are caused by bacteria, and salmonellosis is the most common bacterial food-borne illness. Salmonellosis is usually preventable.

How can salmonella bacteria on raw meat and poultry make people sick?

First, "food abuse" allows bacteria to survive and often to multiply. For example, if the meat knife is used to cut the salad lettuce without first being washed, the lettuce can be contaminated by any bacteria on the meat. The person who eats the salad then also eats the bacteria.

Next, if the bacteria survive the stomach acid, they reproduce themselves in the small intestine. One cell becomes two, two become four, four become sixteen, and so on. When there are "enough" bacteria, they cause a salmonella infection.

How many bacteria does it take to make people sick?

There is no exact number, but the more bacteria consumed, the more likely a person is to get sick. Healthy adults have eaten food containing millions of bacteria without getting sick. Other people have gotten sick from as few as 10 bacteria in their food.

What are the symptoms of salmonellosis?

According to the Centers for Disease Control, stomach pain occurs within 6 to 48 hours after the food was eaten. Most people get diarrhea, and many people have upset stomachs, chills, fever, or headache. Most people feel better within 3 to 5 days. Many persons with salmonellosis may believe they have the flu and may never see a doctor.

How many people get sick from salmonellosis?

At least 40,000 salmonella infections are reported every year, but experts believe that between 400,000 and 4 million persons each year actually contract salmonellosis.

How does the doctor know a person has salmonellosis?

The only way to tell for sure is to conduct laboratory tests on the stools of the person who got sick, a process that takes several days.

How many people die from salmonellosis?

Salmonella infections can be life-threatening for the very young, the very old and for persons already weakened by other serious diseases, such as AIDS. Reports show about 2 deaths for every 1,000 known cases of salmonellosis, but experts believe that about 500 persons each year actually die from salmonella infections.

What foods are most likely to make people sick?

Foods don't make people sick -- bacteria do. Any raw food of animal origin -- meat, poultry, raw milk, fish, and shellfish --may carry salmonellae. The bacteria can survive to cause illness if these specific foods are not thoroughly cooked. The bacteria can also cause illness if they contaminate any other food that comes in contact with the raw food, either directly or by way of dirty hands or dirty equipment. Salmonellosis is a world-wide, food-chain problem that can't be "blamed" on any one food.

**Wouldn't less bacteria on animals mean less human illness?**

FSIS and the National Academy of Sciences agree with this logical assumption. However, there will always be some risk of bacterial contamination on raw foods of animal origin. So, food safety will always be necessary to prevent bacteria on raw foods from causing illness.

Are Kosher chickens lower in salmonella bacteria?

FSIS does not know of any valid scientific information showing that Kosher chickens carry more or fewer salmonella bacteria than other poultry.

Anti-Salmonella Strategy
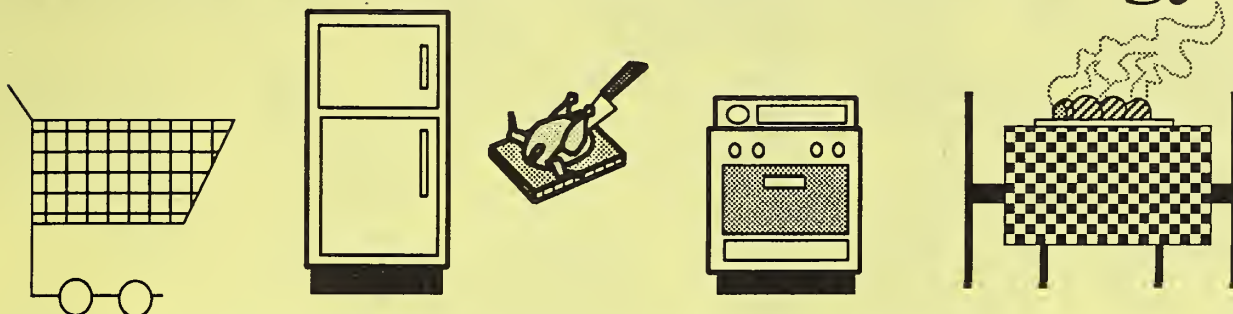
Bacteria on raw foods of animal origin do not have to cause illness. Investigations of actual outbreaks reported to the Centers for Disease Control show that **bacteria + food safety mistakes can = illness.**

Errors during food shopping, transport, preparation, serving, or storage can enable bacteria to grow or even just survive. If foods are prepared a day or more ahead of time **and** food handlers make mistakes, the chance of illness can increase, because bacteria have more time to multiply. In outbreaks traced to bacteria or other organisms in meat or poultry, one or more of the following eight food handling mistakes enabled bacteria on raw products to survive and cause food-borne illness:

Improper cooling	Improper hot storage of cooked foods
Undercooking	Cross-contamination of cooked foods by raw foods
Infected person touching cooked food	Inadequate cleaning of equipment
Inadequate reheating of cooked and chilled foods	Eating raw meat or poultry

Therefore, the key to preventing illness -- at home, in a restaurant, at a church picnic, anywhere -- is to destroy the bacteria. Below are some hints, based on information from actual outbreaks, that can destroy or stop growth of salmonella bacteria and other bacteria that can cause illness.

Clean it.

Salmonella bacteria can survive in water, soil, and on the kitchen counter, so sanitation can make a big difference-- especially in preventing bacteria that could be on raw products from contaminating other foods. (This is called cross-contamination.)

*Wash your hands frequently with SOAP and water for at least 20 seconds -- after you use the bathroom, before you start food preparation, before you start working with a new food or a new tool, when you finish food preparation, and before you serve food.

*Prevent cross-contamination. **Never** let raw meat and poultry, or their juices, come in contact with cooked meat or any other food -- raw or cooked.

*If you use a dishcloth for cleaning kitchen surfaces, switch to a clean one after you work with raw meat or poultry. Choose a type that will stand up to laundering in hot water and bleach. Otherwise, use paper towels and throw away after use.

*Cut raw meat or poultry on an acrylic cutting board that is thoroughly cleaned after each use. Use that favorite (but porous) wooden one only for cutting bread or vegetables.

*Wash cutting boards, knives, counter, and other implements with detergent and hot water immediately after you use them with raw meat and poultry.

*After washing and rinsing equipment and counters, professional food service workerss also sanitize and rinse them. Consumers who want to sanitize implements after washing can use a solution of 2 to 3 teaspoons household bleach in 1 quart of water, followed by a cold water rinse. (Note: Sanitizing doesn't work on dirty surfaces, so clean them first.)

*Serve cooked meat and poultry on clean plates. When you replenish the banquet, replenish the serving plates. Don't put grilled meat or poultry back on the plate with raw juices.

*Keep pets away from food, and away from cooking and eating surfaces and equipment.

Cook it.

185 ^{0}
160 ^{0}
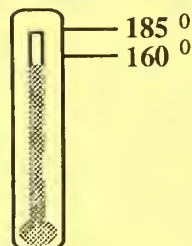
Salmonellae -- however many there are -- do not survive when beef or pork is cooked to an internal temperature of at least 160 degrees F, or when poultry is cooked to 185 degrees F. (Some experts believe that this country's passion for rare beef explains why beef -- which carries very low levels of salmonella bacteria -- is involved in more reported almonellosis outbreaks than poultry.) Always cook meat and poultry thoroughly, and be just as careful when microwaving as when using traditional ovens.

*Use a meat thermometer to check "doneness." If meat is too thin for a thermometer, follow the recipe and cook till the juices are clear.

*Never interrupt cooking -- it's a "half-baked idea" that can make you sick. After thawing foods in the microwave, cook them immediately.

*If reheating leftovers, cover and reheat thoroughly to 165 ^{0} F just in case bacteria survived in the food during refrigeration or freezing. Let sauces and gravies reach a rolling boil.

*Don't store the latecomer's cooked meat and poultry dinner in an off or warm oven. Hold the food above 140 ^{0} F. (But, within 2 hours after cooking, refrigerate the food.)

Cool it.
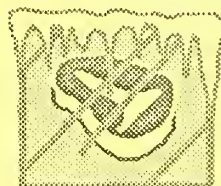
Refrigeration and even freezing do not kill all salmonella or other bacteria, but proper cooling can usually prevent salmonellae from multiplying.

*Refrigerate raw meat and poultry as soon as possible after you take it out of the grocery meat case.

*Refrigerate food containing cooked meat or poultry within 2 hours after cooking.

*Refrigerate or freeze cooked meat or poultry casseroles in covered shallow pans rather than deep pots. Leave space around the containers to let cold air circulate.

*Never thaw frozen meat and poultry on the kitchen counter. Thaw it in the refrigerator or, if you are in a hurry, in a bag under cold running water.

*Remember that refrigeration or freezing cannot be counted on to kill many salmonella bacteria. It can't "fix" a mistake such as leaving cooked turkey at room temperature for more than 2 hours--it can only postpone the risk of illness. If in doubt, throw food out.

Do you have other questions about meat and poultry food safety or labeling?

Consumers: Call the tollfree Meat and Poultry Hotline at 1-800-535-4555, 10 a.m. to 4 p.m., Eastern Standard Time.
Press inquiries: Please call (202) 447-9113.